

**In the Claims**

1 Claims 1-14 (Cancelled)

1 15. (Original) A method for determining the location of a contaminant in a fluid flow system,  
2 comprising the steps of:



1 Claims 16-32 (Cancelled)

1 33. (Previously presented) The method of claim 15 wherein the injecting and the advecting in

2 steps (a) and (b) of claim 15 are done to inundate the entire fluid flow system with the tracers.

1 34. (Previously presented) The method of claim 15 wherein a plurality of partitioning tracers  
2 are used.

1 35. (Previously presented) The method of claim 15 wherein the presence of the partitioning  
2 tracer after the perturbation needed for location of the contaminant is also used to detect the  
3 presence of the contaminant.

1 36. (Previously presented) The method of claim 15 wherein the time of arrival is determined  
2 from the leading edge of the tracer concentration curve.

1 37. (Previously presented) The method of claim 15 wherein said second flow velocity is  
2 determined from the mean time of arrival of the tracer at said second flow rate.

1 38. (Previously presented) The method of claim 15 wherein the location of the contamination  
2 is further comprised of the steps of (a) extracting the partitioning tracer at said second location at  
3 said first flow rate and measuring the concentration of the partitioning tracer over a period of time  
4 and (b) determining the location of the contaminant from (1) the times of arrival of the partitioning  
5 tracer relative to the start time of the second advection flow after the perturbation and to the start  
6 time of the first advection flow and (2) the flow rates of the second advection flow and the flow  
7 rate of the first advection flow.

1    39. (Previously presented) The method of claim 15 wherein the method of location can be used  
2    to locate said contaminant at more than one location when the tracer concentrations from each  
3    location are distinguishable.

1    40. (Previously presented) The method of claim 15 wherein the method of location can be used  
2    to locate more than one contaminant in a fluid flow system by using one or more tracers that  
3    interact with each contaminant.

1    41. (Previously presented) The method of claim 15 wherein the method of location can be used  
2    to locate a plurality of contaminants at a plurality of locations.

1    Claims 42-47 (Cancelled)

1    48. (Previously presented) The method of claim 33 wherein the partitioning tracer that is  
2    injected into the fluid flow system is allowed sufficient time for the tracer to interact with the  
3    contaminant before the tracer is advected.

1    49. (Previously presented) The method of claim 33, wherein only the section of the fluid flow  
2    system that is contaminated need be inundated with tracer.

1    50. (Previously presented) The method of claim 33 wherein the presence of the partitioning  
2    tracer after the perturbation needed for location of the contaminant is also used to detect the  
3    presence of the contaminant.

1    51. (Previously presented) The method of claim 33 wherein the time of arrival is determined  
2    from the leading edge of the tracer concentration curve.

1    52. (Previously presented) The method of claim 33 wherein said second flow velocity is  
2    determined from the mean time of arrival of the tracer at said second flow rate.

1    53. (Previously presented) The method of claim 33 wherein the method of location can be used  
2    to locate said contaminant at more than one location when the tracer concentrations from each  
3    location are distinguishable.

1    54. (Previously presented) The method of claim 33 wherein the method of location can be used  
2    to locate more than one contaminant in a fluid flow system by using one or more tracers that  
3    interact with each contaminant.

1    55. (Previously presented) The method of claim 33 wherein the method of location can be used  
2    to locate a plurality of contaminants at a plurality of locations.

1    56. (Previously presented) The method of claim 35 wherein the method of detection can be  
2    used to detect said contaminant at more than one location when the tracer concentrations from  
3    each location are distinguishable.

1    57. (Previously presented) The method of claim 35 wherein the method of detection can be  
2    used to detect more than one contaminant in a fluid flow system by using one or more tracers that  
3    interact with each contaminant.

1       58. (Previously presented) The method of claim 35 wherein the method of detection can be  
2       used to detect a plurality of contaminants at a plurality of locations.

1       59. (Previously presented) The method of claim 35 wherein said detecting is determined from  
2       a comparison of the characteristic features of the measured concentrations of the conservative and  
3       interactive tracers.

1       60. (Previously presented) The method of claim 50 wherein the method of detection can be  
2       used to detect said contaminant at more than one location when the tracer concentrations from  
3       each location are distinguishable.

1       61. (Previously presented) The method of claim 50 wherein the method of detection can be  
2       used to detect more than one contaminant in a fluid flow system by using one or more tracers that  
3       interact with each contaminant.

1       62. (Previously presented) The method of claim 50 wherein the method of detection can be  
2       used to detect a plurality of contaminants at a plurality of locations.

1       63. (Previously presented) The method of claim 50 wherein said detecting is determined from  
2       a comparison of the characteristic features of the measured concentrations of the conservative and  
3       interactive tracers.

1       64. (Previously presented) The method of claim 37 wherein said mean time of arrival is

2 determined from the centroid of the tracer concentration curve.

1 65. (Previously presented) The method of claim 38 wherein the location is determined from  
2 the product of the ratio of the time of arrival of the partitioning tracer at the second flow rate  
3 relative to the first flow rate, the ratio of the flow rate of the partitioning tracer at the second flow  
4 rate relative to the first flow rate, and the length of the fluid flow system between the injection and  
5 extraction points.

1 66. (Previously presented) The method of claim 52 wherein said mean time of arrival is  
2 determined from the centroid of the tracer concentration curve.

1 67. (Previously presented) The method of claim 50 wherein said characteristic features are  
2 comprised of the magnitude of the tracer concentrations in certain regions of the concentration  
3 curves such as the peak, the leading edge, or the trailing edge of the curves.

1 68. (Previously presented) The method of claim 50 where said comparison is accomplished  
2 using said tracer concentration curves that represent only a fraction of the total concentration curve  
3 that would have been measured if the collection time were extended.

1 69. (Previously presented) The method of claim 63 wherein said characteristic features are  
2 comprised of the magnitude of the tracer concentrations in certain regions of the concentration  
3 curves such as the peak, the leading edge, or the trailing edge of the curves.

1 70. (Previously presented) The method of claim 63 where said comparison is accomplished

2 using said tracer concentration curves that represent only a fraction of the total concentration curve  
3 that would have been measured if the collection time were extended.

1 Claims 71-77 (Cancelled)